

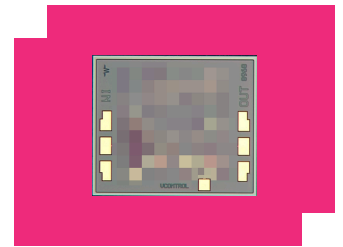
HLM-100001CH

High Power DC - 10GHz Limiter

DEVICE OVERVIEW

General Description

The HLM-100001CH is a high-power GaAs Schottky diode signal limiter featuring high IP3 over a broad DC-10GHz bandwidth. It offers low insertion loss and excellent return loss from DC through X band and has a typical 1 dB compression point of 11 dBm. Its high power handling makes it ideal for protecting sensitive components and for applications requiring high linearity. It is available as a wire-bondable die.



[Download s-parameters here](#)

Features

- Low 0.7 dB loss at 5 GHz
- +8.5 to +11.5 dBm Flat Leakage
- Typical P1dB of +11 dBm
- Small signal S2P data available

Applications

- RF Transceivers
- Test and Measurement Equipment
- SATCOM
- Aerospace and Defense

Functional Block Diagram



Part Ordering Options

Part Number	Description	Package	Green Status	Product Lifecycle	Export Classification
HLM-100001CH	High Power DC - 10GHz Limiter	CH	REACH RoHS	Released	EAR99

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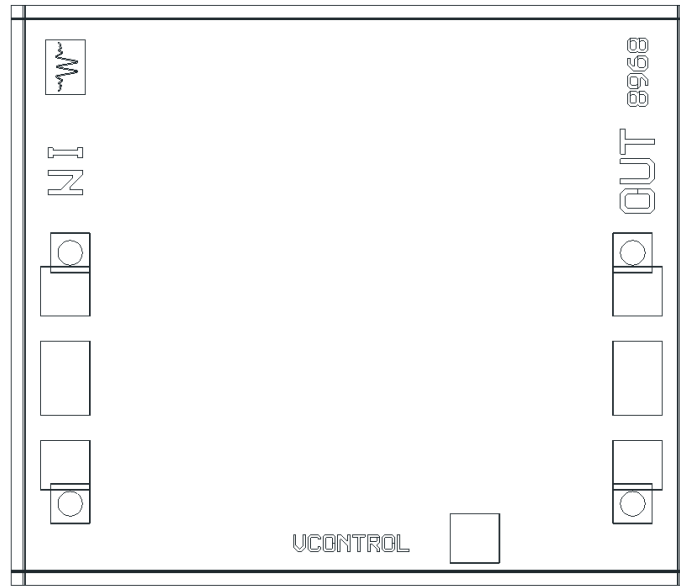
Revision History

Revision Code	Revision Date	Comment
-	2024-03-28	Datasheet Initial Release

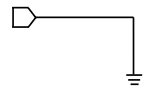
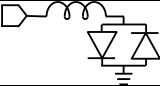
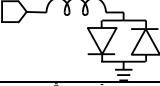
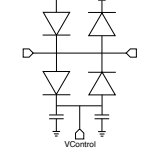
Port Configuration and Functions

Port Diagram

A top-down view of the HLM-100001CH's package outline drawing is shown below. The HLM-100001CH has the input and output ports given in Port Functions.



Port Functions

Port	Function	Description	Equivalent Circuit for Package
Ground Paddle	Ground	CH package ground path is provided through the substrate and ground bond pads.	
IN	Input	IN is the RF input port and is diode connected for the CH package.	
OUT	Output	OUT is the RF output port and is diode connected for the CH package.	
VCONTROL	V Control	A 10Ω resistor with at least a 30 mA current rating must be used in series with VCONTROL and tied to ground for normal operation.	

Specifications

Absolute Maximum Ratings

The Absolute Maximum Ratings indicate limits beyond which damage may occur to the device. If these limits are exceeded, the device may be inoperable or have a reduced lifetime.

Parameter	Maximum Rating	Unit
Maximum Operating Temperature	100	°C
Maximum Storage Temperature	125	°C
Minimum Operating Temperature	-55	°C
Minimum Storage Temperature	-65	°C
RF Power Handling, CW @ 10 GHz, 25°C	10	W
θ_{JC} , Junction to Case Thermal Resistance	35	°C/W

RF Power Handling represents an instantaneous, catastrophic limit and it isn't derated for frequency, temperature, pulse conditions, or unit to unit variation.

Package Information

Parameter	Details	Rating
Dimensions	-	1.17 x 1.38 mm

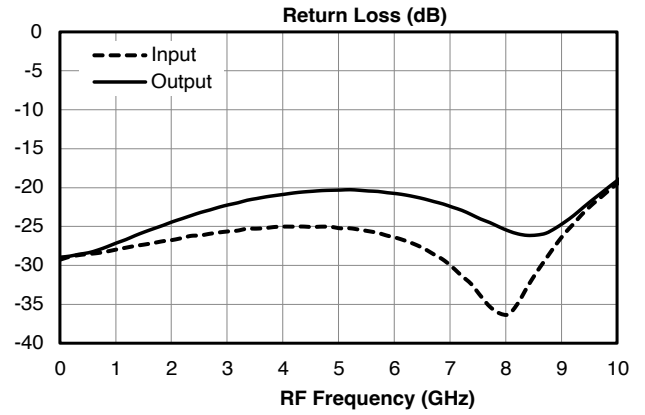
Electrical Specifications

The electrical specifications apply at TA=+25°C in a 50Ω system. Typical data shown is for the CH package limiter unless otherwise specified. Linear Specifications valid for input power up to the 0.1dB compression point. See typical performance plots EVB PSM Package for P0.1dB graph. Min and Max limits are guaranteed at TA=+25°C.

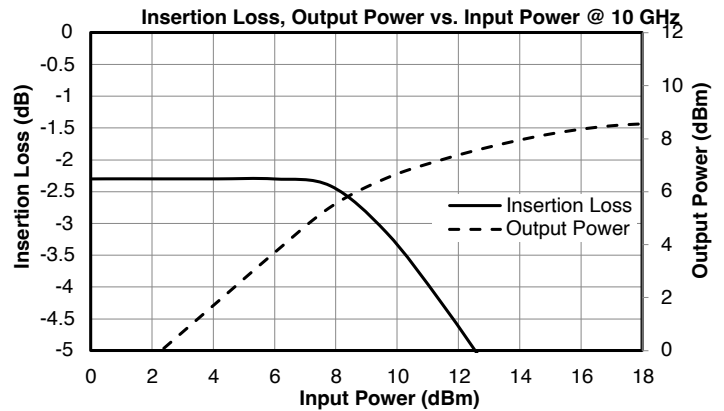
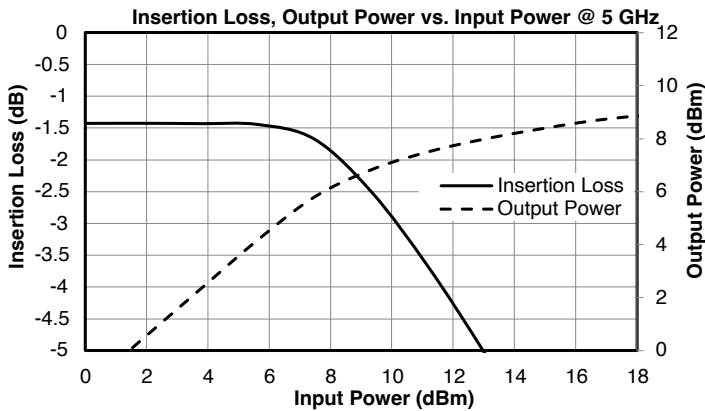
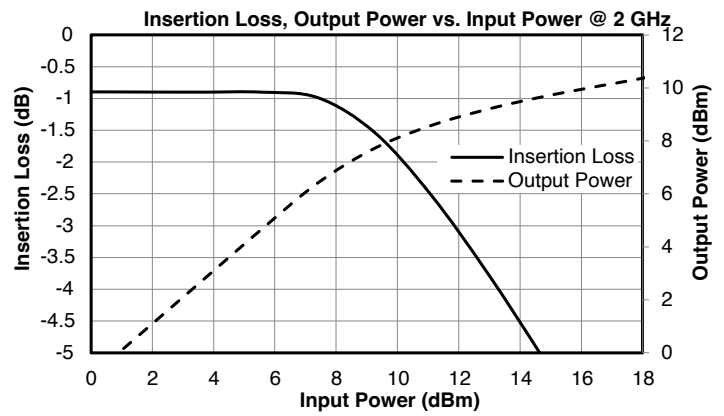
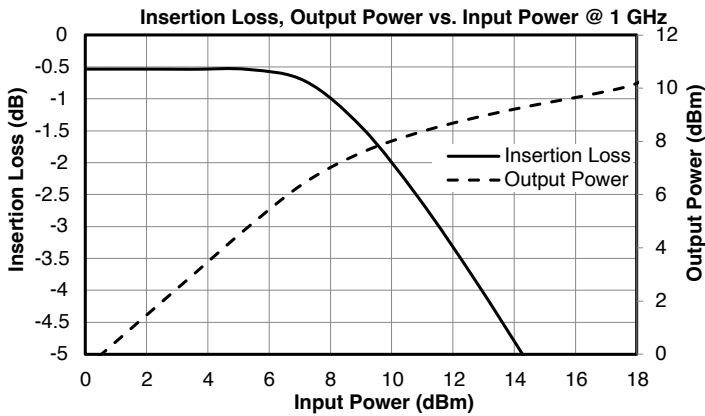
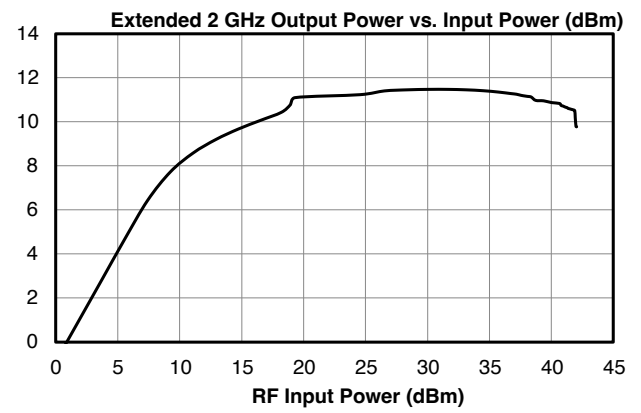
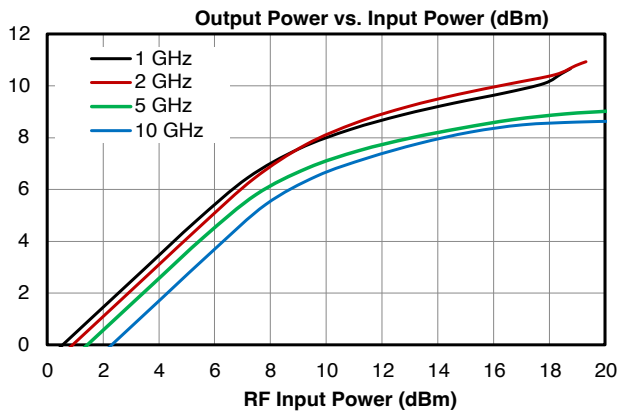
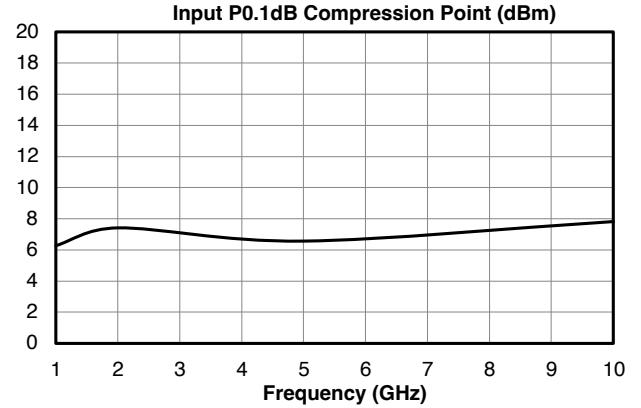
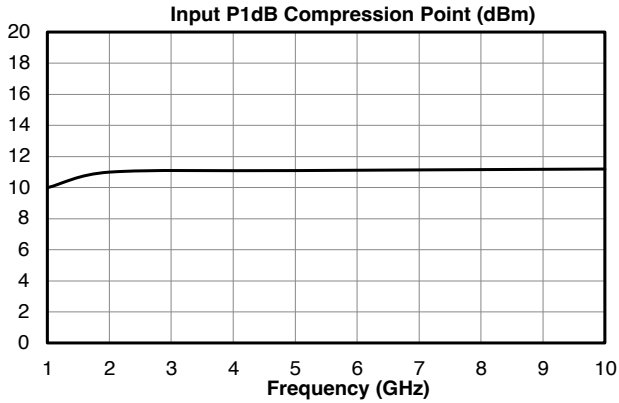
Parameter	Test Conditions	Minimum Frequency (GHz)	Maximum Frequency (GHz)	Min	Typ	Max	Unit
Flat Leakage ¹	-	10	10	-	8.5	-	dBm
Flat Leakage ²	-	2	2	-	11.5	-	dBm
Input IP3 ³	DC - 10 GHz	0	10	-	27	-	dBm
Input P1dB ⁴	DC - 10 GHz	0	10	-	11	-	dBm
Insertion Loss	DC - 10 GHz	0	10	-	0.8	1.5	dB
Return Loss	DC - 10 GHz	0	10	-	22	-	dB

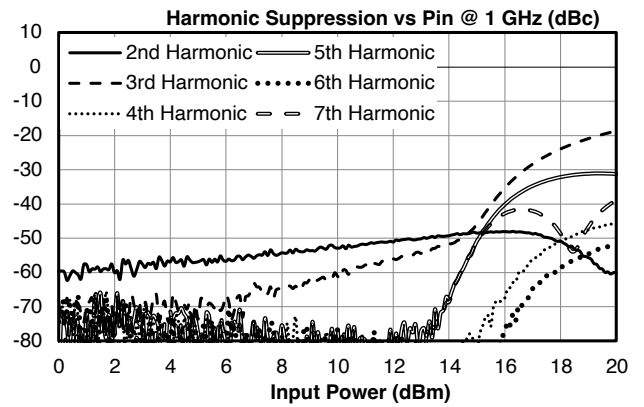
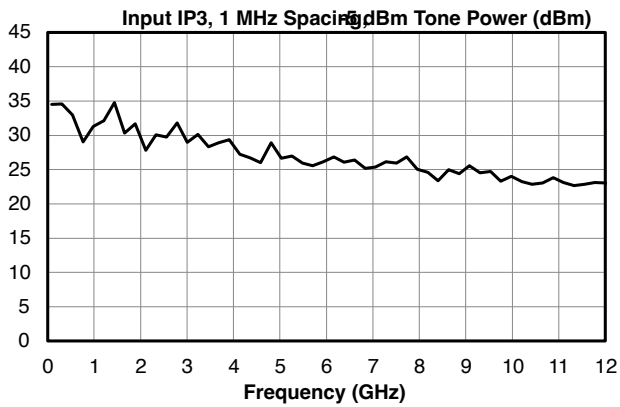
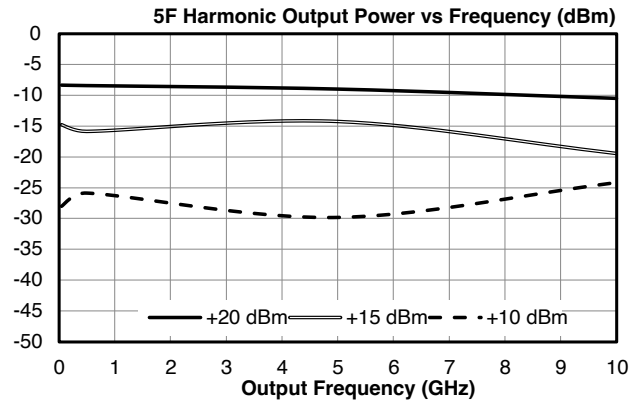
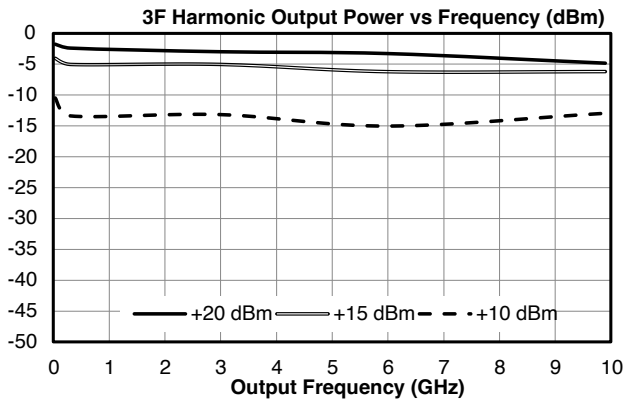
^[1]^[2]^[3]^[4] Data taken from HLM-100001PSM EVB package.

Typical Performance Plots CH Package



Typical Performance Plots EVB PSM Package

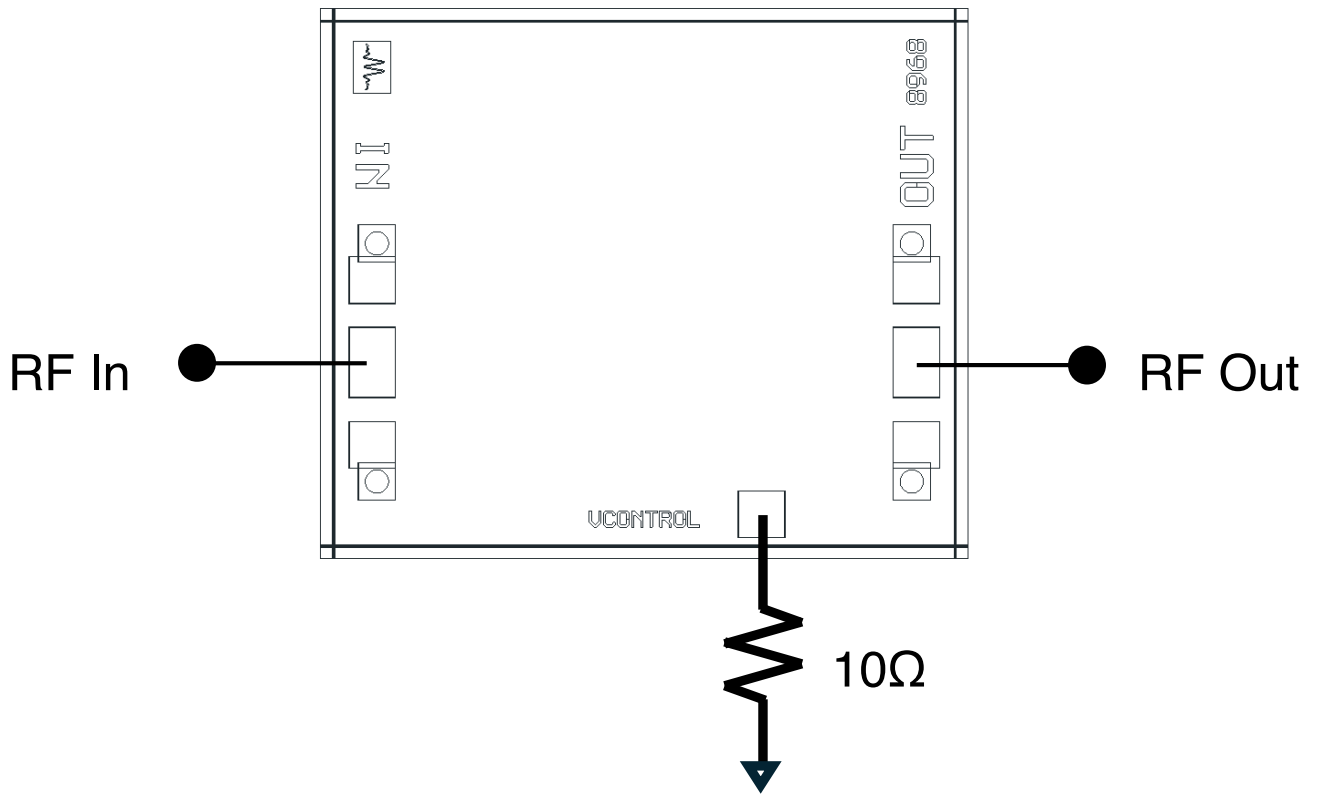




Application Information

Below is the application circuit for the HLM-100001CH.

Application Circuit



Application Circuit Description

For normal operation, a 10 Ω resistor with at least a 30 mA current rating must be used in series with the VCONTROL pin and tied to ground. Operation without a resistor will causes resonances.

Die Mounting Recommendations

Mounting and Bonding Recommendations

Marki MMICs should be attached directly to a ground plane with conductive epoxy. The ground plane electrical impedance should be as low as practically possible. This will prevent resonances and permit the best possible electrical performance. Datasheet performance is only guaranteed in an environment with a low electrical impedance ground.

Mounting- To epoxy the chip, apply a minimum amount of conductive epoxy to the mounting surface so that a thin epoxy fillet is observed around the perimeter of the chip. Cure epoxy according to manufacturer instructions. The HLM-100001CH die will dissipate significant heat when limiting and needs to be mounted to a surface with low thermal resistance using an epoxy with low thermal resistance to achieve datasheet power handling capability.

Wire Bonding - Ball or wedge bond with 0.025 mm (1 mil) diameter pure gold wire. Thermosonic wirebonding with a nominal stage temperature of 150 °C and a ball bonding force of 40 to 50 grams or wedge bonding force of 18 to 22 grams is recommended. Use the minimum level of ultrasonic energy to achieve reliable wirebonds. Wirebonds should be started on the chip and terminated on the package or substrate. All bonds should be as short as possible <0.31 mm (12 mils).

Circuit Considerations – 50 Ω transmission lines should be used for all high frequency connections in and out of the chip. Wirebonds should be kept as short as possible, with multiple wirebonds recommended for higher frequency connections to reduce parasitic inductance. In circumstances where the chip more than .001” thinner than the substrate, a heat spreading spacer tab is optional to further reduce bondwire length and parasitic inductance.

Handling Precautions

General Handling

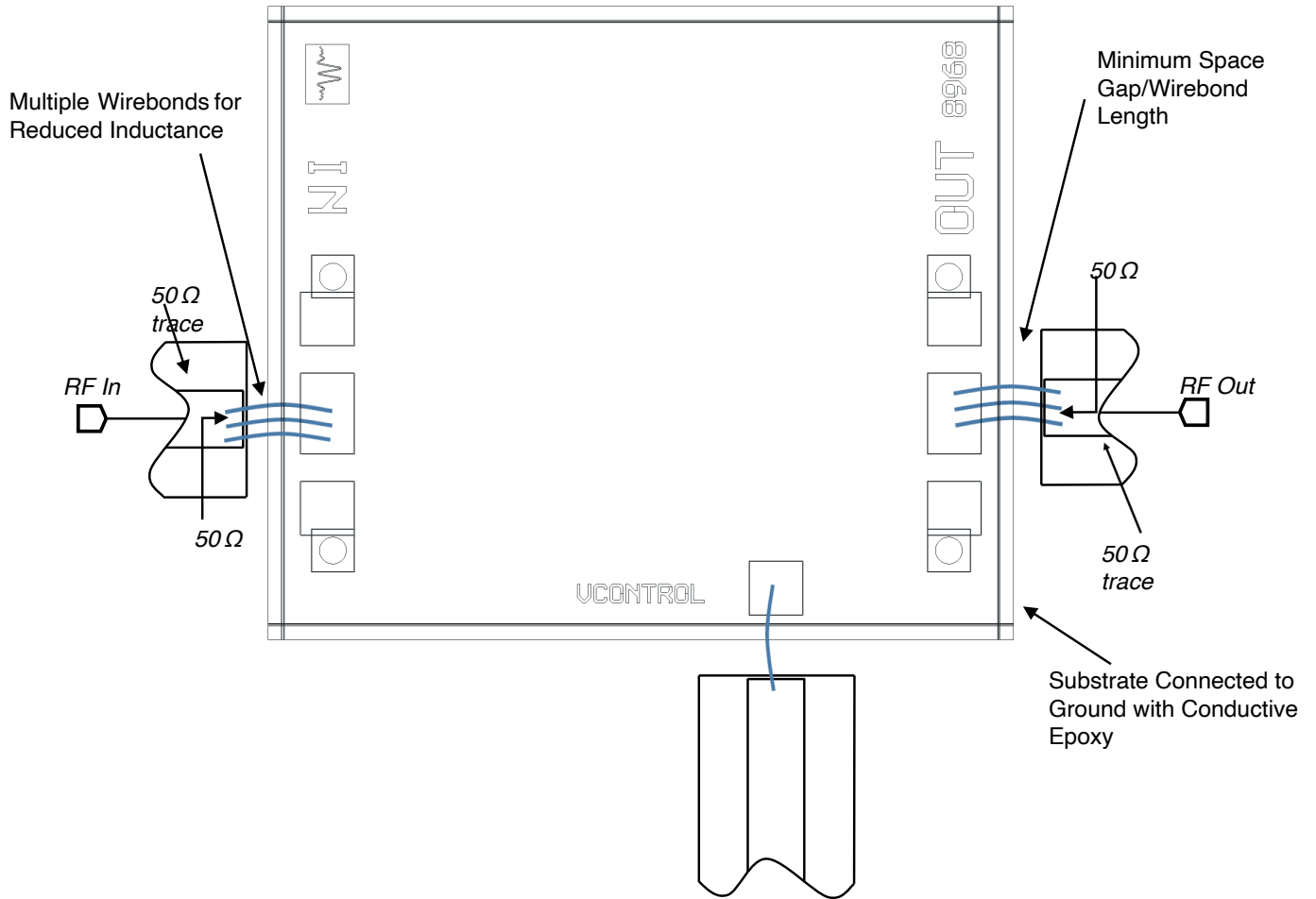
Chips should be handled with care using tweezers or a vacuum collet. Users should take precautions to protect chips from direct human contact that can deposit contaminants, like perspiration and skin oils on any of the chip's surfaces.

Static Sensitivity

GaAs MMIC devices are sensitive to ESD and should be handled, assembled, tested, and transported only in static protected environments.

Cleaning and Storage: Do not attempt to clean the chip with a liquid cleaning system or expose the bare chips to liquid. Once the ESD sensitive bags the chips are stored in are opened, chips should be stored in a dry nitrogen atmosphere.

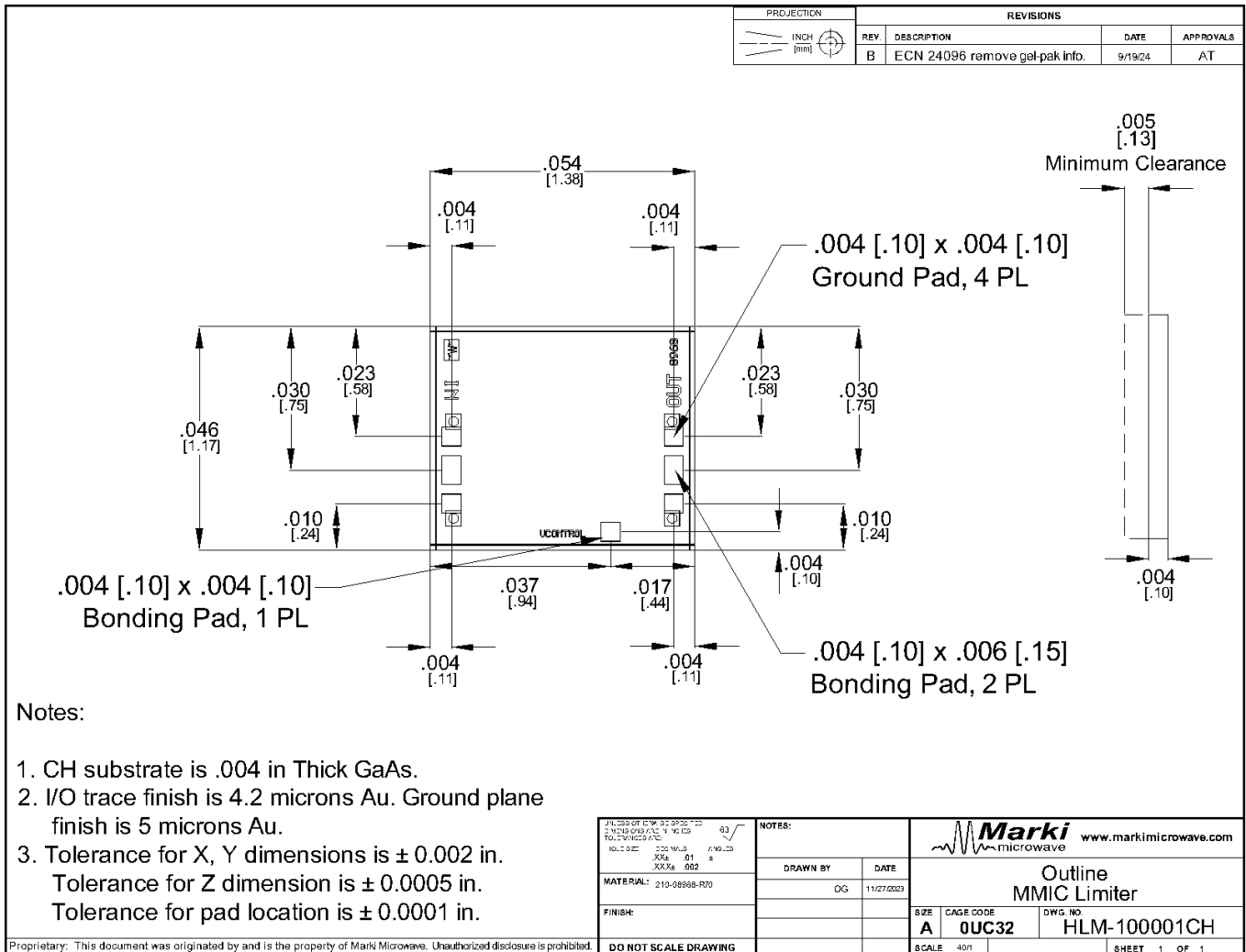
Bonding Diagram



Mechanical Data

Outline Drawing

Download : [Outline 2D Drawing](#)



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